**Research plan – individual project**

**(Message brokers)**



Yordan Doykov

# Problem

I am a semester 6 student and need to build an enterprise grade scalable system. I plan to use microservices for my different application modules. However, they should not interact with HTTP as they need to be decoupled and they need to scale independently.

# Opportunity

This brings forward the opportunity to research popular ways in which microservices interact with each other and whether a message broker solution can cover the use case of this semester. This will be able to clarify an unknown area in my knowledge and drive the individual project forward.

# Desired outcome

By the end of this research a solution must have been found for the problem at hand. The solution needs to be proven by conducting tests through a simple example where several microservices are able to interact with each other through decoupled means.

A research report will be delivered where all of the questions below are answered. The solution found by this research will also be implemented in the individual project as a part of the “walking skeleton” deliverable.

The estimated time to conduct this research is 2 week.

# Main research question:

How can microservices interact with each other and still be decoupled?

Sub-research questions:

1. What are the most popular ways to decouple microservices?
2. What is a message broker?
3. How does a message broker guarantee that messages are delivered?
4. How can a message broker be implemented in the context of the project?
5. Are there any pitfalls to using a message broker?

# Approach

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| Question | Research approach/type | Description |
| What are the most popular ways to decouple microservices? | Library/Field   * Design pattern research * Document analysis | Studying common design patterns will reveal how microservices are decoupled by most people. For a second reference, the structure of project at D-centralize (current side job) will be analyzed. |
| What is a message broker? | Library   * Available product analysis * Literature study | It makes sense to answer this question with library research. The documentation of an existing broker like RabbitMQ can be referenced, along with general literature regarding the matter. |
| How does a message broker guarantee that messages are delivered? | Library   * Available product analysis * Literature study | Just like last question, it depends on the message broker in question. Everyone has a different implementation, so reading their documentation would answer the question. |
| How can a message broker be implemented in the context of the project? | Field/Lab   * Domain modelling * Component test | Domain modelling would show how a message broker can be implemented in the project’s context. Testing with a small-scale example would be a good proof whether it would work on a large scale. |
| Are there any pitfalls to using a message broker? | Library/Lab   * Expert interview * Component test | Interviewing someone who has worked with microservices and message brokers is a good source of knowledge. Pitfalls could also be tested on a small-scale. |